

What is claimed is

1. A gene coding a protein involved in carotenoid biosynthesis, which has nucleotide sequences selected from a group consisting of nucleotide sequences represented by SEQ. ID. No 5, No 7, No 9, No 11, No 13 and No 15.
2. The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtW* coding β -carotene ketolase and represented by SEQ. ID. No 5.
3. The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtZ* coding β -carotene hydroxylase and represented by SEQ. ID. No 7.
4. The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtY* coding lycopene cyclase and represented by SEQ. ID. No 9.
- 25 5. The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtI* coding

phytoene desaturase and represented by SEQ. ID. No 11.

6. The gene as set forth in claim 1, wherein the
5 gene has nucleotide sequences of *crtB* coding phytoene synthase and represented by SEQ. ID. No 13.
7. The gene as set forth in claim 1, wherein the
10 gene has nucleotide sequences of *crtE* coding geranylgeranyl pyrophosphate synthase and represented by SEQ. ID. No 15.
8. A *crt* gene containing all the genes of claim 2
15 ~ claim 7 and represented by SEQ. ID. No 4.
9. A protein encoded by the gene of claim 1,
which has nucleotide sequences selected from a
group consisting of nucleotide sequences
20 represented by SEQ. ID. No 6, No 8, No 10, No
12, No 14 and No 16.
10. A recombinant vector containing the *crt* gene
of claim 8.

11. The recombinant vector as set forth in claim
10, wherein the vector is pCR-XL-TOPO-crtfull
having a cleavage map represented in FIG. 16.

5 12. An *E. coli* transformant transformed with the
recombinant vector of claim 11.

13. A method for producing carotenoid comprising
the following steps:

10 1) Cloning the crt gene of claim 8;
2) Constructing a recombinant vector in which
the crt gene of the above step 1) was
inserted;
15 3) Transfecting a host cell with the
recombinant vector of the step 2); and
4) Recovering carotenoids from the culture
cells in which a strain transformed with
the above recombinant vector was being
cultured.

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14. The method as set forth in claim 13, wherein
the recombinant vector is that of claim 11.

25 15. The method as set forth in claim 13, wherein
the host cell is *E. coli* or yeast.

16. The method as set forth in claim 13, wherein
the recovery of carotenoids is performed from
the culture cells in which the *E. coli* was
5 being cultured.

17. The method as set forth in claim 13, wherein
the cartenoid is β -carotene or astaxanthine.

10 18. A *Paracoccus haeundaensis* producing
astaxanthine, which has a 16S rDNA nucleotide
sequence represented by SEQ. ID. No 3.

15 19. The *Paracoccus haeundaensis* as set forth in
claim 18, wherein the strain is represented by
accession No: KCCM-10460.